

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service
Agency for Toxic Substances
and Disease Registry

Memorandum

Date . September 18, 1989

From Toxicologist
Emergency Response Branch, Office of Health Assessment, ATSDR

Subject Health Consultation: Monsanto Agricultural Company, J. F. Queeny Plant,
St. Louis, Missouri

To Mr. Daniel Harper
Public Health Advisor
EPA Region VII
Kansas City, Kansas

Through: Chief, Emergency Response Branch, OHA, ATSDR

STATEMENT OF PROBLEM

The Monsanto Agricultural Company, J. F. Queeny Plant in St. Louis, Missouri has a waste incinerator that burns a waste stream containing chlorinated compounds. The flu gas from this incinerator contains chlorine. The Environmental Protection Agency has completed a computer simulation for the spatial distribution of chlorine around the stack. This model used actual stack discharge values and meteorological data for the 5 year period 1973 through 1977. The EPA provided the ATSDR with model calculations for the maximum annual average, 1-hour, and 24-hour concentrations and their spatial relationship to the stack. The EPA requested the Agency for Toxic Substances and Disease Registry to evaluate the predicted concentrations with regard to acceptable human exposure to chlorine gas in the ambient air.

DOCUMENTS REVIEWED

1. Memorandum, Michael J. Sanderson, RCRA Branch Chief, EPA to Daniel Harper, ATSDR, undated.
2. Memorandum, Richard L. Daye, Air Planning and Development Section, EPA, to John Smith, RCRA, EPA with attachments, September 6, 1989.
3. Preliminary Draft, "Health Assessment Document for Chlorine and Hydrogen Chloride," Dynasac Corporation, March 20, 1987.
4. "Emergency Response Planning Guidelines," American Industrial Hygiene Association, April 20, 1988.
5. Occupational Safety and Health Administration, Rules and Regulations, Federal Register, Vol 54, p 2444, 2445, 2453, and 2456, January 1989.



R00107871
RCRA RECORDS CENTER
ACC#07

Page 2 - Daniel Harper

6. Reference Dose (RfD) Description and Use in Health Risk assessments, EPA, undated.
7. "IRIS File, Nitric Oxide," EPA.

CONTAMINANTS AND PATHWAYS

The contaminant modeled by EPA was chlorine. The EPA did not provide any data showing the presence of other contaminants in the stack gas for this plant. The ATSDR recently reviewed data from another Monsanto plant burning the same wastes. The stack sample data from that plant included results for hydrochloric acid, 1,2-DCE (1,2-dichloroethane), PERC (tetrachloroethane), and MCB (monochlorobenzene). Thus, this plant probably has these same chemicals and perhaps others in its incinerator discharge. At the other plant chlorine was the chemical of primary concern because of its concentration and toxicity. This is very likely the case for this site also. The only route of exposure for the public to these chemicals is by the air pathway.

DISCUSSION

The ATSDR has no information on what chemicals, in addition to chlorine are present in the stack gas from this site. Given the information from the other plant, burning the same waste, chlorine is very likely the pollutant of primary concern in the stack gas discharged from this incinerator.

The EPA air model using the data from the incinerator test with the highest burn rate and the worst case meteorological conditions gave maximum annual average chlorine concentration of 6.9 ug/m^3 and a maximum 1-hour concentration of 293 ug/m^3 . The model predicts that the maximum annual average would occur 50 meters from the stack with a bearing of 130 degrees. The predicted location for the maximum 1-hour concentration is 75 feet from the stack at a bearing of 140 degrees. These locations are both less than 50 meters from the Union Pacific building.

Both the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) and the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) for chlorine is 1500 ug/m^3 and a Short-term Exposure Limit (STEL) of 3000 ug/m^3 . The National Institute for Occupational Safety and Health (NIOSH) recommended in its criteria document a limit of $1,500 \text{ ug/m}^3$ measured over 15 minutes. OSHA in its January 1989 revision to its chlorine PEL and STEL state:

"... that an exposure limit of 1.5 ug/m^3 TWA with a 3 mg/m^3 15 minute STEL will reduce the risk of irritation and pulmonary function decline in workers, ..."

Page 3 - Daniel Harper

This shows that OSHA believes there are data showing that long-term 1 exposure to the previous PEL and STEL concentrations did cause respiratory irritation and the decline in pulmonary function for workers.

Animal studies exposing 20 rats per group to 1, 3, and 9 ppm (2,900, 8,700, and 26,100 $\mu\text{g}/\text{m}^3$) for six hours per day five days per week for only six weeks showed pathological and clinical changes in the 3 and 9 ppm animals. The animals in the higher exposure groups also experienced significant decreases in body weight. The highest exposure group showed inflammation of the upper and/or lower respiratory tract. The investigation showed that the animals in the two groups exposed to the lower concentrations also experienced the same inflammation but to a lesser extent.

Human studies published in 1983 studies have shown that 8-hour exposures to chlorine of 0.5 ppm (1,450 $\mu\text{g}/\text{m}^3$) acceptable with no discomfort. When the chlorine concentration was 1 ppm (2.9 $\mu\text{g}/\text{m}^3$), the human subjects experienced some throat irritation from an 8-hour exposure. Older literature concerning human exposure showed irritation at lower chlorine concentrations. However, because of apparent methodological shortcomings in those studies, OSHA based its rule making on the more recent studies. This decision shows that OSHA believes the recent study results more accurately describes the human response to these levels of chlorine in air than do the older studies.

CONCLUSIONS AND RECOMMENDATIONS

The ATSDR believes that the chlorine releases should remain as low as practicable until establishment of permanent emissions limits upon completion of incinerator modifications.

The EPA air model predicts that the highest concentrations will occur off-site on the property of Union Pacific. Because of this the ATSDR believes that STEL divided by 10 (300 $\mu\text{g}/\text{m}^3$) is an appropriate guideline for the maximum 1-hour chlorine concentration at this site. The model predicted maximum 1-hour chlorine concentration of 295 $\mu\text{g}/\text{m}^3$ essentially equal to this guidance value. Because of this the ATSDR believes that real-time monitoring is necessary to validate the model. The ATSDR believes that this will protect the public from excessive exposure to chlorine.

The ATSDR believes that a guidance value for the annual average concentration should not exceed the workplace PEL/TLV divided by 150. This would give 10 $\mu\text{g}/\text{m}^3$ as a guidance value for this site. The model predicted maximum annual average of 6.9 $\mu\text{g}/\text{m}^3$ is less than this guidance value.

Page 4 - Daniel Harper

A malfunctioning incinerator could release even greater quantities of chlorine than those measured in the short-term test. Under such conditions employees at other portions of this facility, those of Union Pacific, and the general public might receive excessive exposure to chlorine. Thus, it would behoove the operator of the facility to continuously monitor chlorine in the flu gas. When the chlorine concentration in the flu gas exceeds those used in the EPA model calculations they should immediately correct the problem.

Mark A. McClanahan, Ph.D.

Subtitle C. This interpretation was recently upheld in a decision of the U.S. District Court of Appeals (United Technologies Corporation v. EPA, 821 F 2d. 714 (DC Cir. 1987)). Thus, by proposing this interpretation as the definition of facility in today's rule, EPA is not modifying its basic interpretation as previously elaborated for the purpose of implementing §3004(u). There are, however, several aspects of this definition which merit further clarification.

The definition of facility in today's proposal at §264.501 is not intended to alter or subsume the existing -- and narrower -- definition of "facility" that is given in 40 CFR 260.10. That definition describes the facility as "...all contiguous land and structures...used for treating, storing or disposing of hazardous waste..." EPA intends to retain this definition for the purposes of implementing RCRA Subtitle C requirements, with the exception of Subpart S corrective action. At the same time, however, the Agency is reviewing its uses of the term "facility" in other parts of the Subtitle C regulations to ensure consistent usage.

Today's proposed definition refers to "contiguous property" under the control of the owner/operator. Several questions have been raised as to the Agency's interpretation of "contiguous property" in the context of defining the areal limits of the facility. Clearly, property that is owned by the owner/operator that is located apart from the facility (i.e., is separated by land owned by others) is not part of the "facility." EPA does intend, however, to consider property that is separated only by a public right-of-way (such as a roadway or a power transmission right-of-way) to be contiguous property. The term "contiguous property" also has significant additional meaning when applied to a facility where the owner is a different entity from

the operator. For example, if a 100-acre parcel of land were owned by a company which leases five acres of it to another company which, in turn, engages in hazardous waste management on the five acres leased, the "facility" for the purposes of corrective action would be the entire 100-acre parcel. Likewise, if (in the same example) the operator also owned 20 acres of land located contiguous to the 100-acre parcel, but not contiguous to the five acre parcel, the facility would be the combined 120 acres. EPA invites comment on these interpretations of contiguous property.

In some cases, adjacent properties may be separately owned by two different subsidiaries of a parent company, where only one of the subsidiary's operations involves management of hazardous wastes. In such cases, EPA intends to consider the ownership to be held by the parent corporation. Thus, in the example provided, the facility would include both properties.

EPA acknowledges that in some situations, "ownership" of property can involve a complex legal determination. EPA solicits comment and information on the interpretation offered in general, and specifically on the issue of how ownership or "control" of property should be determined in the context of subsidiary-parent companies.

2. Release. Today's proposal includes the definition of "release" articulated in the preamble to the July 15, 1985, Codification Rule. This definition essentially repeats the CERCLA definition of release. Today's proposed definition also includes language from SARA which extended the concept of "release" to include abandoned or discarded barrels, containers, and other closed receptacles containing hazardous wastes or hazardous constituents.

Although this definition of release is quite broad, §3004(u) is limited to addressing releases from solid waste management units. Thus, there may be releases at a facility that are not associated with solid waste management units, and that are therefore not subject to Subpart S corrective action. (See discussion below which defines solid waste management unit.)

Many facilities have releases from solid waste management units that are issued permits under other environmental laws. For example, stack emissions from a solid waste refuse incinerator at a RCRA facility are likely to be authorized under a State-issued air permit. Another example would be NPDES (National Pollutant Discharge Elimination System, under the Clean Water Act), or State-equivalent, permits for discharges to surface water from an industrial wastewater treatment system. EPA does not intend to utilize the §3004(u) corrective action authority to supersede or routinely reevaluate such permitted releases. However, in the course of investigating RCRA facilities for corrective action purposes, EPA may find situations where permitted releases from SWMUs have created threats to human health and the environment. In such a case, EPA would refer the information to the relevant permitting authority or program office for action. If the permitting authority is unable to compel corrective action for the release, EPA will take necessary action under §3004(u) (for facilities with RCRA permits) or §3008(h) (for interim status facilities), as appropriate, and to the extent not inconsistent with certain applicable laws (see Section 1006(a) of RCRA).

3. Solid Waste Management Unit (SWMU). Today's rule proposes the following definition of solid waste management unit:

"Any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at a facility at which hazardous wastes or hazardous constituents have been routinely and systematically released."

This definition is also derived from the Agency interpretation discussed in the July 15, 1985, Codification Rule. A discernible unit in this context includes the types of units typically identified with the RCRA regulatory program, including landfills, surface impoundments, land treatment units, waste piles, tanks, container storage areas, incinerators, injection wells, wastewater treatment units, waste recycling units, and other physical, chemical or biological treatment units.

The proposed definition also includes as a type of solid waste management units those areas of a facility at which hazardous wastes or hazardous constituents have been released in a routine and systematic manner. One example of such a unit would be a wood preservative "kickback drippage" area, where pressure treated wood is stored in a manner which allows preservative fluids routinely to drip onto the soil, eventually creating an area of highly contaminated soils.

For clarification purposes, it may also be useful to identify certain types of releases that the Agency does not propose to consider solid waste management units using the "routine and systematic" criterion. A one-time spill of hazardous wastes (such as from a vehicle travelling across the facility) would not be considered a solid waste management unit. If the spill were not cleaned up, however, such a spill would be illegal disposal, and therefore subject to enforcement action under §3008(a) or §7003 of RCRA.

Similarly, leakage from a chemical product storage tank would not constitute a solid waste management unit (in the absence of routine and systematic management practices which allow spillage or leakage). Likewise, releases from production processes, and contamination resulting from such releases, will generally not be considered solid waste management units, unless the Agency finds that the releases have been routine and systematic in nature. (Such releases could, however, be addressed as illegal disposal under §3008(a) or §7003.) EPA solicits comment on these interpretations, and on the overall definition of solid waste management unit.

EPA recognizes that these interpretations have the effect of precluding §3004(u) from addressing some environmental problems at RCRA facilities. However, EPA, under other authorities provided in RCRA (e.g., §3008(a) and §7003) or CERCLA (e.g., CERCLA §104 or §106), or States, under State authorities, will exercise these authorities as necessary to correct such problems and to protect human health and the environment.

The RCRA program has identified certain specific units and waste management practices at facilities about which questions have been raised concerning applicability of the definition of a solid waste management unit. One such question relates to military firing ranges and impact areas. Such areas are often potentially hazardous, due to the presence of unexploded ordnance. EPA has tentatively decided that such areas should not be considered solid waste management units. There is a strong argument that unexploded ordnance fired during target practice is not discarded material which falls within the regulatory definition of "solid waste". Ordnance that does not explode would be expected to land on the ground. Hence, the

"ordinary use" of ordnance includes placement on land. Moreover, it is possible that the user has not abandoned or discarded the ordnance, but rather intends to reuse or recycle them at some time in the future. In addition, a U.S. District Court decision (Barcello vs. Brown, 478 F. Supp. 646, 668-669 (D. Puerto Rico 1979)), has suggested that materials resulting from uniquely military activities engaged in by no other parties fall outside the definition of solid waste, and thus would not be subject to §3004(u) corrective action. The Agency requests comment on its tentative decision not to extend the definition of solid waste management unit to military firing ranges.

Another issue which raises questions regarding the definition of "solid waste management unit" relates to industrial process collection sewers. Process collection sewers are typically designed and operated as a system of piping into which wastes are introduced, and which usually discharge into a wastewater treatment system. The Agency believes that there are sound policy, technical, and legal reasons for considering process collection sewers solid waste management units. Program experience has indicated that many such sewer systems leak, causing contamination of subsoils and ground water.

EPA recognizes that there may be technical problems associated with investigating releases from process collection sewers, and with correcting leakage. Information and comment are specifically solicited on EPA's tentative decision to treat process collection sewers as solid waste management units, and on technical approaches and limitations to investigating and correcting releases from such systems.

For essentially the same reasons as described above for process sewers, EPA also proposes to include open (or closed) ditches that are used to convey

solid wastes as solid waste management units; comment is also solicited on this interpretation.

4. Hazardous Waste and Hazardous Constituents. Section 3004(u) requires corrective action for releases of "hazardous wastes or constituents." The Agency believes that use of the term "hazardous waste" denotes "hazardous waste" as defined in §1004(5) of RCRA. Accordingly, today's proposed rule repeats the statutory definition of "hazardous waste" found in that section. The term "hazardous waste" is distinguished from the phrase "hazardous waste listed and identified," which is used elsewhere in the statute to denote that subset of hazardous waste specifically listed and identified by the Agency pursuant to §3001 of RCRA. Thus, the remedial authority under §3004(u) is not limited to releases of wastes specifically listed in 40 CFR Part 261 or identified pursuant to the characteristic tests found in that section. Rather, it extends potentially to any substance meeting the statutory definition. However, EPA believes that use of the phrase "hazardous wastes or constituents" (emphasis added) indicates that Congress was particularly concerned that the Agency use the §3004(u) authority to address a specific subset of this broad category, this is hazardous constituents.

The term hazardous constituent used in §3004(u) means those constituents found in Appendix VIII to 40 CFR Part 261. See H. Rep. No. 98-198, 98th Cong., 1st Sess. 60-61, May 17, 1983. In addition, the Agency proposes to include within the definition those constituents identified in Appendix IX to 40 CFR Part 264. Appendix IX generally constitutes a subset of Appendix VIII constituents particularly suitable for ground-water analyses. However, it also includes additional constituents not found on Appendix VIII, but commonly